

1. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{16x^3 + 72x^2 + 17x - 60}{8x^2 - 2x - 15}$$

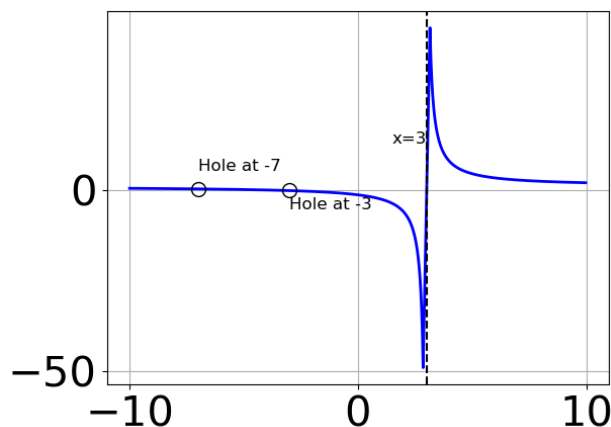
- A. Vertical Asymptotes of  $x = 1.5$  and  $x = 0.75$  with a hole at  $x = -1.25$
  - B. Vertical Asymptote of  $x = 2.0$  and hole at  $x = -1.25$
  - C. Vertical Asymptote of  $x = 1.5$  and hole at  $x = -1.25$
  - D. Holes at  $x = 1.5$  and  $x = -1.25$  with no vertical asymptotes.
  - E. Vertical Asymptotes of  $x = 1.5$  and  $x = -1.25$  with no holes.
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2. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{6x^3 + 5x^2 - 16x - 15}{8x^2 + 6x - 9}$$

- A. Vertical Asymptote of  $x = 0.75$  and hole at  $x = -1.5$
  - B. Vertical Asymptotes of  $x = 0.75$  and  $x = -1.5$  with no holes.
  - C. Vertical Asymptote of  $x = 0.75$  and hole at  $x = -1.5$
  - D. Holes at  $x = 0.75$  and  $x = -1.5$  with no vertical asymptotes.
  - E. Vertical Asymptotes of  $x = 0.75$  and  $x = 1.667$  with a hole at  $x = -1.5$
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3. Which of the following functions *could* be the graph below?



- A.  $f(x) = \frac{x^3 + 8.0x^2 + 4.0x - 48.0}{x^3 + 7.0x^2 - 9.0x - 63.0}$
- B.  $f(x) = \frac{x^3 - 14.0x^2 + 61.0x - 84.0}{x^3 - 7.0x^2 - 9.0x + 63.0}$
- C.  $f(x) = \frac{x^3 + 14.0x^2 + 61.0x + 84.0}{x^3 + 7.0x^2 - 9.0x - 63.0}$
- D.  $f(x) = \frac{x^3 - 11.0x^2 + 38.0x - 40.0}{x^3 - 7.0x^2 - 9.0x + 63.0}$
- E. None of the above are possible equations for the graph.

4. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{12x^3 - 47x^2 + 60x - 25}{12x^2 - 31x + 20}$$

- A. Vertical Asymptotes of  $x = 1.333$  and  $x = 1.25$  with no holes.
- B. Vertical Asymptote of  $x = 1.0$  and hole at  $x = 1.25$
- C. Vertical Asymptotes of  $x = 1.333$  and  $x = 1.667$  with a hole at  $x = 1.25$
- D. Holes at  $x = 1.333$  and  $x = 1.25$  with no vertical asymptotes.
- E. Vertical Asymptote of  $x = 1.333$  and hole at  $x = 1.25$

5. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{6x^3 - 7x^2 - 43x + 30}{2x^2 + 13x + 20}$$

- A. Oblique Asymptote of  $y = 3x - 23$ .
  - B. Horizontal Asymptote of  $y = 3.0$  and Oblique Asymptote of  $y = 3x - 23$
  - C. Horizontal Asymptote of  $y = -4.0$  and Oblique Asymptote of  $y = 3x - 23$
  - D. Horizontal Asymptote at  $y = -4.0$
  - E. Horizontal Asymptote of  $y = 3.0$
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6. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{8x^3 + 10x^2 - 21x - 18}{20x^3 + 38x^2 + 52x + 12}$$

- A. Vertical Asymptote of  $y = -0.400$
  - B. None of the above
  - C. Vertical Asymptote of  $y = -2$
  - D. Horizontal Asymptote of  $y = 0$
  - E. Horizontal Asymptote of  $y = 0.400$
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7. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{12x^3 + 37x^2 - 59x - 60}{9x^2 - 9x - 10}$$

- A. Vertical Asymptote of  $x = 1.333$  and hole at  $x = 1.667$
- B. Holes at  $x = -0.667$  and  $x = 1.667$  with no vertical asymptotes.
- C. Vertical Asymptote of  $x = -0.667$  and hole at  $x = 1.667$

- D. Vertical Asymptotes of  $x = -0.667$  and  $x = -0.75$  with a hole at  $x = 1.667$
- E. Vertical Asymptotes of  $x = -0.667$  and  $x = 1.667$  with no holes.
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8. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{16x^3 - 64x^2 - 9x + 36}{4x^2 - 17x - 15}$$

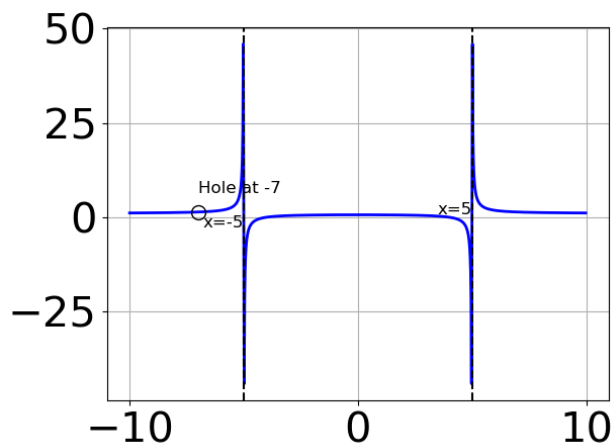
- A. Oblique Asymptote of  $y = 4x + 1$ .
- B. Horizontal Asymptote at  $y = 5.0$
- C. Horizontal Asymptote of  $y = 4.0$
- D. Horizontal Asymptote of  $y = 4.0$  and Oblique Asymptote of  $y = 4x + 1$
- E. Horizontal Asymptote of  $y = 5.0$  and Oblique Asymptote of  $y = 4x + 1$
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9. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{4x^2 + 21x + 20}{20x^3 + 73x^2 + 24x - 45}$$

- A. Horizontal Asymptote of  $y = 0.200$  and Oblique Asymptote of  $y = 5x - 8$
- B. Horizontal Asymptote of  $y = 0$
- C. Oblique Asymptote of  $y = 5x - 8$ .
- D. Horizontal Asymptote of  $y = 0.200$
- E. Horizontal Asymptote at  $y = -4.000$
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10. Which of the following functions *could* be the graph below?



A.  $f(x) = \frac{x^3 + 7.0x^2 - 16.0x - 112.0}{x^3 + 7.0x^2 - 25.0x - 175.0}$

B.  $f(x) = \frac{x^3 + 4.0x^2 - 16.0x - 64.0}{x^3 + 7.0x^2 - 25.0x - 175.0}$

C.  $f(x) = \frac{x^3 - 7.0x^2 - 16.0x + 112.0}{x^3 - 7.0x^2 - 25.0x + 175.0}$

D.  $f(x) = \frac{x^3 - 4.0x^2 - 16.0x + 64.0}{x^3 - 7.0x^2 - 25.0x + 175.0}$

E. None of the above are possible equations for the graph.